8-6 OU III AR 661

GJO–2002–340–TAR
ESL–DP–2002–02
MSG 2.2.1

Environmental Sciences Laboratory

Data Package for Saturated Zone Column Test Location T01–02

Monticello Mill Tailings Site Operable Unit III

June 2002

Prepared for
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Work Performed Under DOE Contract No. DE–AC13–96GJ87335
DOE Task Order No. MAC02–05

WORK SUBMITTAL TO ENVIRONMENTAL SCIENCES LABORATORY

Submittal Date 3/12/02 Date Required ____

Submitted By T Bartlett Signature T Bartlett by SM

Formal Report Required (check one)? Yes ___ No ✓

Project: Monticello OU3 Charge No. 3607-05-012

Analysis Type (check one): Kd ___ Leaching ___ Other ✓ column

Sample Numbers T01-02

Analytes 10 hr collects: As, U, V, Se, Mo, Mn Pb210 @ ACL; pH, ORP, cond alk @ ESL
2 hr collects: As U V Se, Mo Mn; pH, ORP, alk, Cond @ ESL

Solution Composition Syn 92-05 see attached recipe
then Br⁻ tracer

Comments (attach procedure if needed)

3/14 Saturated zone column test. One sample of alluvium will arrive ≤ 3/28/02 see attached email

3/14 Stevenson to Tim, they want data only. No ESL report

4/08 see attached email - submit soil split

Tracking (ESL use only):

Actual Labor Hours (ESL use only):

Sarah Morris

From: Stan Morrison
Sent: Tuesday, March 12, 2002 11:30 AM
To: Sarah Morris
Subject: FW: Monticello OU3 work

Sarah,

When the samples arrive, be sure to prepare a Job Submittal. Find out if they want an ESL report. Document their response (email preferred). I want to keep track of the desire for ESL reports for future communication with PM and DOE. Make sure you have good documentation on the recnet Ken Pill Moab project that did not want a report. Do we have a Job Submittal for the Monticello PRB sampling were doing?

Stan

-----Original Message-----
From: Timothy Bartlett
Sent: Tuesday, March 12, 2002 11:09 AM
To: Stan Morrison; Kristen Mcclellen
Subject: Monticello OU3 work

Stan: Here are two work items the ESL needs to perform for Monticello OU 3 Interim Remedial Action:
1. One column leaching test using the same procedures/test parameters as for previous Monticello OU3 saturated zone column tests. One sample of alluvium will be provided in approximately 1 to 2 weeks.
2. Distilled water leach of a sample of Mancos Fm. shale with leachate analyzed at Analytical Chem. Lab of selenium. I'm guessing a 24-hr agitated leach of lightly crushed sample? Sample will be delivered with alluvium.

	A	B	C	D	E	F	G	H	I	J	K
1	9205 10/3/95 (Actuals provided by Tim Bartlett)										
2		mL per									
3		L of	Na	K	Ca	Mg	NH4	SO4	Cl	NO3	C
4		Soln	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
5	Liquid Components										
6											
7	100g/L K2CO3	0.00		0.00							0.00
8	50g/L NaHCO3 34	17.00	232.74								121.43
9	100g/L Na2SO4.10H2O	0.00	0.00					0.00			
10	100g/L Na2SO4.(0.89 H2O)	0.00	0.00					0.00			
11	500g/L (NH4)2SO4	0.00					0.00	0.00			
12	1.5g/L CaSO4.2H2O 910	455.00			158.96			380.75			
13	1.08 g/L CaSO4	0.00			0.00			0.00			
14	200g/L MgSO4.7H2O +	2.00				39.46		155.91			
15	100g/L K2SO4	0.00		0.00				0.00			
16	conc H2SO4(36N)	0.00						0.00			
17	927.2 g/L CaCl2.2H2O	0.00			0.00				0.00		
18	92.72 g/L CaCl2.2H2O	0.00			0.00				0.00		
19	300g/L NaCl	0.00	0.00						0.00		
20	100g/L MgCl2.6H2O	0.00				0.00			0.00		
21	100g/L NH4Cl	0.00					0.00		0.00		
22	100g/L NaNO3	0.00	0.00							0.00	
23	2% HNO3	0.00								0.00	
24	66.67 g/L NaN3	0.00	0.00								
25											
26											
27											
28	Totals (mg/L)	474.00	232.74	0.00	158.96	39.46	0.00	536.66	0.00	0.00	121.43
29	ACTUAL (mg/L)		40.00	?	250.00	40.00	?	540.00	?	?	70.00
30	Totals (mol/L)		1.01E-02	0.00E+00	3.97E-03	1.62E-03	0.00E+00	5.59E-03	0.00E+00	0.00E+00	1.01E-02
31											
32	ACTUAL pH	6.70									
33	Measured pH(no acid or base)	?									
34	Measured pH (_____ added)										
35	ACTUAL Alk (mg/L CaCO3)	290.00									
36	Measure Alk (no acid or base)	?									
37	Measure Alk (_____ added)										
38											
39											

Sarah Morris

From: Timothy Bartlett
Sent: Monday, April 08, 2002 10:25 AM
To: Stan Morrison; Sarah Morris; Kristen Mcclellen
Subject: FW: Monticello OU3 work

Stan/Sarah: Please proceed with item #1 and hold off on item #2 until further notice. The sample for the saturated zone column test is T01-02. I will deliver it to the ESL Monday 4/8/02 AM. Please also submit a split of the sample for analysis of metals at the Analytical Chemistry Laboratory, as done for previous OU III column tests.
Tim.

-----Original Message-----
From: Timothy Bartlett
Sent: Tuesday, March 12, 2002 11:09 AM
To: Stan Morrison; Kristen Mcclellen
Subject: Monticello OU3 work

Stan: Here are two work items the ESL needs to perform for Monticello OU 3 Interim Remedial Action:
1. One column leaching test using the same procedures/test parameters as for previous Monticello OU3 saturated zone column tests. One sample of alluvium will be provided in approximately 1 to 2 weeks.
2. Distilled water leach of a sample of Mancos Fm. shale with leachate analyzed at Analytical Chem. Lab for selenium. I'm guessing a 24-hr agitated leach of lightly crushed sample? Sample will be delivered with alluvium.

AMPAD EFFICIENCY LINE* 22-210

MOU3-02-10-01

	1	Received from D. Bartlett 2 ziplock bags with soil sample MSG T01-02.
	2	Place in drying pans to air dry
	3	
4/23/02	4	Soil is dry. Sieve to <3 mesh (6.68mm)
	5	
	6	Fill 2" column. Net weight of soil = 1307g. Assemble pump and fraction collector
	7	Pump has size 16 head. Fraction collector set for 10 hr/2hr collection
	8	
4/25	9	Prepare 4L Syn 92-05 water. pH adjust to 6.7 ± 1 mL HNO_3
	10	
0725	11	Begin flow to column @ 0.8 mL/min. Tubing primed to bottom of column
1200	12	pump shut off - plug switched off -
1500	13	Restart flow to column.
1852	14	first outflow. Start fraction collector
	15	
4/26	16	Column running well
	17	
4/28	18	Column running well. Add 4L Syn 92-05, pH adjust to 6.7 to source tank
	19	
4/29	20	Column running well
	21	
4/30 1852	22	DC flow to column.
	23	
	24	Split samples. 10hr splits submitted for As, U, V, Mo Mn, Se PB210
	25	2hr splits submitted for As U V and Mn Se
	26	retain 15 mL split in ESL for U analysis
	27	
5/1/02	28	submit samples NDR 636 → 655 to ACL Req # 17944
	29	
	30	
	31	

AMPAC · EFFICIENCY LINE® 22-210

MOV3-02-10-02

Date / Time	1 ET (hr)	2 Vol (ml)	Cum Vol	4 Time (min)	5 (ml/min)	6 1=375	7 #	8 #	9 (µg/L)	10 pH	11 (µS/cm)	12 (mV)	13 (mg/L
4/25/02 0725	Start flow to column. flow interrupted for 3 hours, no fraction from t=0 time												
1852	just outflow. start fraction collector												
3	measured 0.74 ml/min					IPV = 375 ml (507 min × 0.74 ml/min)			Porosity	= 375 ÷ 953 (known empty vol) =			0.39
4													
4/26/02 0452	10	447	447	600	0.74	1.19	NDR636	1-1	611.5	7.59	2720	184	190
0652	12	90	537	120	0.75	1.43	637	1-2	558.5				
1652	22	503	1040	600	0.84	2.77	638	2-1	508.1	8.11	2170	177	170
1852	24	100	1140	120	0.83	3.04	639	2-2	439.5				
4/27/02 0452	34	503	1643	600	0.84	4.38	640	3-1	380.6	8.15	2100	176	180
0652	36	100	1743	120	0.83	4.65	641	3-2	327.0				
1652	46	508	2251	600	0.85	6.00	642	4-1	274.0	8.04	2060	175	19(
1852	48	101	2352	120	0.84	6.27	643	4-2	239.8				
4/28/02 0452	58	509	2861	600	0.85	7.63	644	5-1	224.3	7.95	2040	177	20(
0652	60	100	2961	120	0.83	7.90	645	5-2	206.2				
1652	70	504	3465	600	0.84	9.24	646	6-1	187.9	8.21	2060	174	17(
1852	72	100	3565	120	0.83	9.51	647	6-2	251.7				
4/29/02 0452	82	504	4069	600	0.84	10.85	648	7-1	372.6	8.24	2020	176	32(
0652	84	101	4170	120	0.84	11.12	649	7-2	354.5				
1652	94	511	4681	600	0.85	12.48	650	8-1	282.6	8.09	2030	178	39(
1852	96	100	4781	120	0.83	12.75	651	8-2	223.3				
4/30/02 0452	106	506	5287	600	0.84	14.10	652	9-1	181.3	7.88	1970	180	30(
0652	108	101	5388	120	0.84	14.37	MW 653	9-2	144.5				
1652	118	514	5902	600	0.86	15.74	654	10-1	120.0	7.78	1900	232	33(
1852	120	102	6004	120	0.85	16.01	655	10-2	110.2				
25													
26													
27													
28													
29													
30													
31													

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MOU3-02-10-03

	1	2	3	4	5	6	7	8	9	10	11	12	13
5/1/02 @ 955	Start flow of Br⁻ tracer to column. (1.288 g/L NaBr) pH adj to 6.7							2L Syr w/ 2-05 @ 1000 mg/L Br⁻					
5/2/02 1000	DC flow to column												
2													
3													
5													
6													
7													
8													
9													
10													
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keg 17944

Grand Junction Office

2597 B 3/4 Road
Grand Junction, Colorado 81503
Telephone (970) 248-6000

Chain-of-Sample Custody

1. Page 1 of 2
2. Date 5/1/02

3. Project Name Monticello

4. Site Location 003

5. Sampler (print name) [illegible]

6. Sample No.	7. Date	8. Time	9. Sample Location	10. Sample Matrix	11. Containers: [illegible]	[illegible]	[illegible]				12. Remarks	13. Condition Received
NDR 036	4/26/02	0452	MSG-T01-02-1.2	H_2O	1	1						
037	↓	0652	-1.4	↓			1					
038	↓	1052	-2.3	↓	1	1						
039	↓	1852	-3.0	↓			1					
040	4/27/02	0452	-4.4	↓	1	1						
041	↓	0852	-4.7	↓			1					
042	↓	1052	-6.0	↓	1	1						
043	↓	1352	-6.3	↓			1					
044	4/28/02	0452	-7.6	↓	1	1						
045	↓	0852	-7.9	↓			1					
046	↓	1152	-9.2	↓	1	1						
047	↓	1352	-9.5	↓			1					
048	4/29/02	0452	-10.9	↓	1	1						

14. Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time	Relinquished by (signature)	Date	Time
[signature]	5/1/02	11:00						
Received by (signature)	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**	**Received by (signature)**	**Date**	**Time**
[signature]	5/1/02	11:00						

15. Method of Shipment	16. Laboratory/Destination	17. Airbill or Receipt Number

18. For Contract Laboratories Only—Receiver to sign, date, and return form by mail or with analytical data package

Company Name ______________ Received by ______________ Date ______________

GJO 1512
5/97

Preparation instructions on back of form.

Distribution: Original accompanies shipment, copies to relinquisher.

1744

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2597 B 3/4 Road
Grand Junction, Colorado 81503
Telephone (970) 248–6000

Chain-of-Sample Custody

1. Page 2 of 2
2. Date 5/1/02

3. Project Name [illegible]
4. Site Location [illegible]
5. Sampler *(print name)* [illegible]

6. Sample No.	7. Date	8. Time	9. Sample Location	10. Sample Matrix	11. Containers [illegible]	[illegible]	[illegible]				12. Remarks	13. Condition Received
NUK 1049	4/29/02	1052	NSA-T01-112-11.1	F			1					
1050	↓	1052	-12.5	↓	1	1						
1051	↓	1352	-12.8	↓			1					
1052	4/30/02	1052	-14.1	↓	1	1						
1053	↓	1152	-14.8	↓			1					
1054	↓	1052	-15.7MI	↓	1		2					
1055	↓	1352	-16.0	↓			1					
											[illegible] 5/1/02	

14. Relinquished by *(signature)*	Date	Time	Relinquished by *(signature)*	Date	Time	Relinquished by *(signature)*	Date	Time
[illegible]	5/1/02	11:00						
Received by *(signature)*	**Date**	**Time**	**Received by** *(signature)*	**Date**	**Time**	**Received by** *(signature)*	**Date**	**Time**
[illegible]	5/1/02	11:00						

15. Method of Shipment

16. Laboratory/Destination

17. Airbill or Receipt Number

18. For Contract Laboratories Only—Receiver to sign, date, and return form by mail or with analytical data package

Company Name ________ Received by ________ Date ________

GJO 1812
5/97

Preparation instructions on back of form.

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2597 B 3/4 Road
Grand Junction, Colorado 81503
Telephone (970) 248–6000

Chain-of-Sample Custody

1. Page 1 of 1
2. Date 4/8/02

3. Project Name MSG OU3 IRA
4. Site Location Monticello UT
5. Sampler *(print name)* T. Bartlett

6. Sample No.	7. Date	8. Time	9. Sample Location	10. Sample Matrix	11. Containers: 4 gallon bg.	12. Remarks	13. Condition Received
T01-02	4/4/02	—	T01-02	SOIL	2	2 plastic bags w/sample of ~~Saturated~~ zone alluvium for ~~ESL~~ ESL column leach testing per MSG OU3 IRA Work Plan.	

14. Relinquished by *(signature)*	Date	Time	Relinquished by *(signature)*	Date	Time	Relinquished by *(signature)*	Date	Time
T. Bartlett	4/8/02	1100						
Received by *(signature)*	**Date**	**Time**	**Received by** *(signature)*	**Date**	**Time**	**Received by** *(signature)*	**Date**	**Time**
[illegible]	4/8/02	1100						

15. Method of Shipment	16. Laboratory/Destination	17. Airbill or Receipt Number
Hand	GJO ESL	NA

18. For Contract Laboratories Only—Receiver to sign, date, and return form by mail or with analytical data package

Company Name _____ Received by _____ Date _____

GJO 1512
5/97

Preparation instructions on back of form.

Distribution: Original accompanies shipment, copies to relinquisher.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	MSG T01-02 Column Test																
2	1309 g of <3 mesh (<6.68 mm) soil, air dried																
3	Use Syn 92-05 water pH adjusted to 6.7																
4	Flow = 0.8mL/min.																
5	507 min to fill column @0.74mL/min, 1 pore volume = 375 mL, Porosity = 0.39 [375/953 (known empty vol)]																
6																	
7	Date	Time	ET	Vol	Cum Vol	Collect	Rate	Pore Vol	ACL #	Collect	U	pH	EC	ORP	ALK	Br	Br Spike
8			(hr)	(mL)	(mL)	Time	(mL/	(1=		#	(ug/L)		(uS/cm)	(mV)	(mg/L	(mg/L)	Recovery
9						(min)	min)	375mL)							CaCO3)		
10																	
11	######	4:52	10	447	447	600	0.75	1.19	NDR636	1-1	611.5	7.59	2720	184	190		
12		6:52	12	90	537	120	0.75	1.43	637	1-2	558.5						
13		16:52	22	503	1040	600	0.84	2.77	638	2-1	508.1	8.11	2170	177	170		
14		18:52	24	100	1140	120	0.83	3.04	639	2-2	439.5						
15	######	4:52	34	503	1643	600	0.84	4.38	640	3-1	380.6	8.15	2100	176	180		
16		6:52	36	100	1743	120	0.83	4.65	641	3-2	327						
17		16:52	46	508	2251	600	0.85	6.00	642	4-1	274	8.04	2060	175	190		
18		18:52	48	101	2352	120	0.84	6.27	643	4-2	239.8						
19	######	4:52	58	509	2861	600	0.85	7.63	644	5-1	224.3	7.95	2040	177	200		
20		6:52	60	100	2961	120	0.83	7.90	645	5-2	206.2						
21		16:52	70	504	3465	600	0.84	9.24	646	6-1	187.9	8.21	2060	174	170		
22		18:52	72	100	3565	120	0.83	9.51	647	6-2	251.7						
23	######	4:52	82	504	4069	600	0.84	10.85	648	7-1	372.6	8.24	2020	176	320		
24		6:52	84	101	4170	120	0.84	11.12	649	7-2	354.5						
25		16:52	94	511	4681	600	0.85	12.48	650	8-1	282.6	8.09	2030	178	390		
26		18:52	96	100	4781	120	0.83	12.75	651	8-2	223.3						
27	######	4:52	106	506	5287	600	0.84	14.10	652	9-1	181.3	7.88	1970	180	300		
28		6:52	108	101	5388	120	0.84	14.37	653	9-2	144.5						
29		16:52	118	514	5902	600	0.86	15.74	654	10-1	120	7.78	1900	222	330		
30		18:52	120	102	6004	120	0.85	16.01	655	10-2	110.2						
31																	
32																	
33	######	7:55	Restart flow to column w/Syn 92-05 spiked w/100 mg/L Br (1.288g/LNaBR), ph adj 6.7														
34				25	6004	30	0.83	16.01		1						<1	
35			121	25	6029	30	0.83	16.08		2						<1	
36				25	6054	30	0.83	16.14		3						<1	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
37			122	25	6079	30	0.83	16.21		4						<1	
38				25	6104	30	0.83	16.28		5						<1	
39			123	25	6129	30	0.83	16.34		6						<1	
40				25	6154	30	0.83	16.41		7						2.86	
41			124	25	6179	30	0.83	16.48		8						6.79	
42				25	6204	30	0.83	16.54		9						21.44	
43			125	25	6229	30	0.83	16.61		10						64.77	101%
44				25	6254	30	0.83	16.68		11						136.54	
45			126	25	6279	30	0.83	16.74		12						238.72	
46				25	6304	30	0.83	16.81		13						344.60	
47			127	25	6329	30	0.83	16.88		14						444.40	
48				25	6354	30	0.83	16.94		15						559.52	
49			128	25	6379	30	0.83	17.01		16						645.88	
50				25	6404	30	0.83	17.08		17						717.73	
51			129	25	6429	30	0.83	17.14		18						772.88	
52				25	6454	30	0.83	17.21		19						812.19	
53			130	25	6479	30	0.83	17.28		20						849.26	80%
54				25	3504	30	0.83	17.34		21						870.86	
55			131	25	6529	30	0.83	17.41		22						902.53	
56				25	6554	30	0.83	17.48		23						918.63	
57			132	25	6579	30	0.83	17.54		24						932.37	
58				25	6604	30	0.83	17.61		25						952.31	
59			133	25	6629	30	0.83	17.68		26						954.70	
60				25	6654	30	0.83	17.74		27						963.67	
61			134	25	6679	30	0.83	17.81		28						981.03	
62				25	6704	30	0.83	17.88		29						986.19	
63			135	25	6729	30	0.83	17.94		30						991.62	74%
64				25	6754	30	0.83	18.01		31						983.58	
65			136	25	6779	30	0.83	18.08		32						1003.93	
66				25	6804	30	0.83	18.14		33						1013.26	
67			137	25	6829	30	0.83	18.21		34						1020.96	
68				25	6854	30	0.83	18.28		35						1021.71	
69			138	25	6879	30	0.83	18.34		36						1026.12	
70				25	6904	30	0.83	18.41		37						1034.04	
71			139	25	6929	30	0.83	18.48		38						1030.59	
72				25	6954	30	0.83	18.54		39						1032.22	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
73			140	25	6979	30	0.83	18.61		40						1031.62	73%
74				25	7004	30	0.83	18.68		41						1033.61	
75			141	25	7029	30	0.83	18.74		42						1038.39	
76				25	7054	30	0.83	18.81		43						1042.48	
77			142	25	7079	30	0.83	18.88		44						1034.98	
78				25	7104	30	0.83	18.94		45						1046.72	
79			143	25	7129	30	0.83	19.01		46						1043.38	
80				25	7154	30	0.83	19.08		47						1048.15	
81			144	25	7179	30	0.83	19.14		48						1048.27	
82				25	7204	30	0.83	19.21		49						1050.17	77%
83										Source tank check # 1						1061.57	